

CEMP-RT

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
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ETL 1110-1-160

Technical Letter
No. 1110-1-160

17 April 1995

Engineering and Design
LANDFILL OFF-GAS COLLECTION AND TREATMENT SYSTEMS

1. Purpose. This engineering technical letter (ETL) was written to provide guidance for designers to determine appropriate application of Landfill Off-Gas Collection and Treatment Systems, and to properly design and specify these systems.

2. Applicability. This ETL applies to all HQUSACE elements, major subordinate commands (MSC) , districts, laboratories, and field operating activities having military or civil works design responsibilities. The engineering and design procedures are applicable to all Corps of Engineers projects. Collection and Treatment of landfill off-gas is a requirement at both Federal and municipal sites, including Department of Defense installations. This ETL was written primarily for sites containing Municipal Waste, Hazardous and Toxic Wastes and does not apply to Radioactive Waste sites.

3. References. This ETL should be used in conjunction with design guidance documents listed in this paragraph as well as those listed in Appendix D.

- a. EM 385-1-1, safety and Health Requirements Manual.
- b. ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities.
- c. ER 1110-1-263, Chemical Data Quality Management for Hazardous Waste Remedial Activities.
- d. ER 1110-345-100, Design Policy for Military Construction.
- e. ER 1110-345-700, Design Analyses.
- g. ER 1110-345-710, Design Drawings.
- h. ER 1110-345-720, Construction Specifications.
- i. TM 5-814-5, Sanitary Landfill.



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4. Discussions. The attached appendices present the procedures and considerations associated with the engineering and design of landfill off-gas collection and treatment systems. The following appendices are attached:

a. Appendix A - Design Considerations: The information presented in this appendix provides a comprehensive overview of design and engineering considerations for Landfill Off-Gas Collection and Treatment, including:

- (1) Background information, theory, and definitions.
- (2) Theories of operations for passive and active gas collection systems and gas treatment for energy recovery systems.
- (3) A summary of off-gas collection and treatment applicability, a comparison of options, and typical operating performance.
- (4) An overview of design considerations from gas collection through gas treatment and recovery or disposal and specific design considerations for components of the Landfill Off-Gas Collection and Treatment equipment and associated accessories and auxiliary systems.
- (5) A summary of legal requirements and permits.
- (6) Emissions characterization and treatability studies.
- (7) Equipment sizing criteria.
- (8) Construction materials and installation specifications.
- (9) Operation and Maintenance.
- (10) Design and construction package requirements.

b. Appendix B - Design Calculations. This appendix presents the types of calculations and documents associated with Landfill Off-gas Collection and Treatment applications.

c. Appendix C - Definitions and Acronyms. This appendix presents the definitions and acronyms of terms used throughout the ETL.

d. Appendix D - Bibliography. This appendix provides references and sources of information presented throughout the ETL.

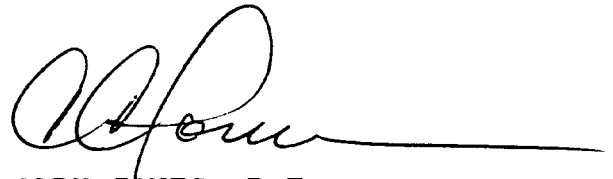
e. Appendix E- Design Examples. This appendix presents design examples for Landfill Off-Gas Collection and Treatment.

5. Action. Each U.S. Army Corps of Engineers design element will be responsible for incorporating guidance into HTRW or military construction designs. This ETL will be considered as the design guidance for the installation of Landfill Off-Gas collection, treatment and monitoring systems.

6. Implementation. This information is furnished to assist designers in design of new and/or retrofit facilities to convey and treat off-gas from municipal and industrial landfills. Information presented herein supplements TM 5-814-5 Sanitary Landfill with information specific to gas collection and control. Use of the ETL is not limited to HTRW, Civil Works or Military Construction.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

5 Appendices
APP A - Design Considerations
APP B - Design Calculations
APP C - Definitions of Terms
APP D - Bibliography
APP E - Design Examples



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